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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/825,743	04/16/2004	Osamu Tsujii	1232-5378	8493
27123	7590	12/15/2005	EXAMINER	
MORGAN & FINNEGAN, L.L.P. 3 WORLD FINANCIAL CENTER NEW YORK, NY 10281-2101			KIKNADZE, IRAKLI	
			ART UNIT	PAPER NUMBER
			2882	

DATE MAILED: 12/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/825,743

Applicant(s)

TSUJII, OSAMU

Examiner

Irakli Kiknadze

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10 is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-7, 11, 12, 15, 16, 19 and 20 is/are rejected.
- 7) ☒ Claim(s) 4, 6, 8, 9, 13, 14, 17 and 18 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 April 2004 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413)          |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)                | Paper No(s)/Mail Date. <u>11182005</u> .                                    |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>8/2/04 &amp; 11/15/04</u> .   | 6) <input type="checkbox"/> Other: ____.                                    |

### **DETAILED ACTION**

1. In response to applicant's telephone inquiry of November 7, 2005 regarding the last Office action, the following corrective action is taken.

The period for reply of 3 MONTHS set in said Office Action is restarted to begin with the mailing date of this letter.

2. A corrected copy of the last Office Action is enclosed.

### ***Claim Objections***

3. Claims 13-17 are objected to because of the following informalities:  
with respect to claims 13, 15 and 17, in line 1, recited limitation that " an apparatus according to any of claim 2 " is awkward and should read -- an apparatus according to claim 2 --;

with respect to claims 14, 16 and 18, in line 1, recited limitation that " an apparatus according to any of claim 3 " is awkward and should read -- an apparatus according to claim --.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 5, 7, 15 and 16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

6. Regarding claims 5, 7, 15 and 16, the phrase "such as" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

### ***Claim Rejections - 35 USC § 102***

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1, 2, 3, 12, 19 and 20 are rejected under 35 U.S.C. 102(e) as being anticipated by D' Ambrosio (US Patent 6,459,760 B1).

With respect to claims 1 and 2, D'Ambrosio teaches a radiation imaging apparatus comprising: an X-ray radiation generating source (125) for X-ray radiating radiation to a subject (140) (Fig.1); a rotating unit (160) for rotating the subject (140) exposed to the radiation from the X-ray source (column 6, lines 15-38); a two-dimensional X-ray detector (127) for detecting the X-ray radiation (column 4, lines 54-67); and a calculating unit (130) for calculating a distance between the X-ray source (125) and the X-ray detector (127); wherein the X-ray source and the X-ray detector are disposed at locations a distance which is the distance calculated by the calculating unit (130) (column 10, lines 41-45).

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With respect to claim 3, D'Ambrosio teaches a radiation imaging apparatus comprising: an X-ray radiation generating source (125) for X-ray radiating radiation to a subject (140) (Fig.1); a rotating unit (160) for rotating the subject (140) exposed to the radiation from the X-ray radiation generating source (column 6, lines 15-38); a two-dimensional X-ray detector (127) for detecting the X-ray radiation (column 4, lines 54-67); and a calculating unit (130) for calculating a distance between the X-ray source (125) and the X-ray detector (127) (column 10, lines 41-45); an X-ray source moving unit for disposing the X-ray source and the X-ray detector at locations a distance which is the distance calculated by the calculating unit (column 7, lines 37-60 and column 12, lines 34-60).

With respect to claims 12, 19 and 20 D'Ambrosio teaches reconstructing an output signal from the X-ray detector (column 6, lines 1-14).

### ***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 5, 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over D' Ambrosio (US Patent 6,459,760 B1) in view of Morita et al. (US Patent Application Publication US 2002/0154728 A1).

With respect to claims 5, 15 and 16, D' Ambrosio teaches claimed invention except for calculating the distance between the radiation source and two-dimensional detector based on the information of the subject. Morita teaches an X-ray radiographic apparatus calculating the distance between the radiation source (R) and two-dimensional detector (D) based on the information of the subject (M) ([0052]-[0055]). It would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the distance calculating teachings of Morita in the apparatus of D'Ambrosio to provide the X-ray radiation imaging apparatus appropriately selecting the irradiating distance between the radiation source and two-dimensional detector because it would allow to reduce an image reconstruction error of the region of the interest of subject.

10. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tomisaki et al. (US Patent 6,152,598) in view of Albert (US Patent 4,057,745).

With respect to claim 11, Tomisaki teaches a radiation imaging apparatus comprising: an X-ray source (11) for radiating radiation to a subject; and a two-dimensional detector (9) for detecting the X-ray radiation; wherein the X-ray source and the detector are disposed at locations a distance between which is about 200 cm in a case of imaging a chest area (column 8, lines 25-39; column 9, lines 40-45) Tomisaki is silent about a rotating unit for rotating the subject exposed to the radiation from the radiation generating source. Albert teaches a scanning X-ray system, wherein a subject is rotated to obtain three-dimensional images while producing medical chest X-rays (column 21, lines 42-55). It would have been obvious to one of ordinary skill in

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the art at the time the invention was made to employ teachings of Albert in the invention of Tomisaki to provide a radiation imaging apparatus with the rotating unit for rotating the subject exposed to the X-ray radiation from the X-ray source because it would allow to acquire sufficient data for reconstructing the three-dimensional images for medical chest X-rays.

***Allowable Subject Matter***

11. Claim 10 is allowed.

12. Claims 4, 6, 7, 8, 9, 13, 14, 17 and 18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

13. Claim 7 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

14. The following is a statement of reasons for the indication of allowable subject matter:

With respect to claim 4, prior art fails to teach or make obvious an imaging apparatus, wherein a cone angle of the radiation from an X-ray source is selected to be in a range between six (6) degrees and ten (10) degrees based on either of information of the subject and information of imaging conditions, and the calculating unit calculates

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the distance between the X-ray source and the two-dimensional X-ray detector based on the selected cone angle as claimed in claim 4.

With respect to claims 6 and 7, prior art fails to teach or make obvious an imaging apparatus, wherein the calculating unit calculates the distance FDD [mm] between the X-ray source and the two-dimensional X-ray detector based on the following relation

$$FDD = 0.5 \times FOV + 0.5 \times HOV / \tan (\Phi / 2) \quad [\text{mm}]$$

where FOV [mm] is an effective diameter of field of view, HOV [mm] is a reconstruction height, and  $\Phi$  [degree] is the cone angle as claimed in claim 6.

With respect to claims 8 and 9, prior art fails to teach or make obvious an imaging apparatus, wherein the calculating unit calculates the distance FDD [mm] between the X-ray generating source and the two-dimensional X-ray detector based on the following relation

$$FDD = 3417 \times \text{SQRT} (D \times E \times T / 84.6) \quad [\text{mm}]$$

where an anodic heat capacity is equal to or less than D [KHU], a cooling ability is equal to or less than E [1/min], and a scanning interval is T [min] as claimed in claim 8.

With respect to claim 10, prior art fails to teach or make obvious an imaging apparatus, wherein the an X-ray source and a two-dimensional X-ray detector are disposed at locations a distance which is in a range between 240 cm and 400 cm, where an imaging height (HOV) is equal to or more than 35 cm, an effective diameter of field of view (FOV) is equal to or more than 39 cm, a tube anodic heat capacity of the



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radiation generating source is equal to or less than 300 KHU, a tube cooling ability is equal to or less than 20 (l/min), and a radiography interval is equal to or less than two (2) minutes as claimed in claim 10.

With respect to claims 13 and 14, prior art fails to teach or make obvious an imaging apparatus, wherein a cone angle of the radiation from an X-ray source is selected to be in a range between six (6) degrees and ten (10) degrees based on either of information of the subject and information of imaging conditions, and the calculating unit calculates the distance between the X-ray source and the two-dimensional X-ray detector based on the selected cone angle as claimed in combination with all elements of claims 2 and 3 correspondingly.

### ***Conclusion***

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Irakli Kiknadze whose telephone number is 571-272-2493. The examiner can normally be reached on 9:00-5:30.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on 571-272-2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Irakli Kiknadze  
November 18, 2005

IK



EDWARD J. GLICK  
SUPERVISORY PATENT EXAMINER